

Work Order ID 60816

Friday, July 23, 2010 10:24:58 AM



Page 1

Item ID: D350-748-101

Accept



Setup Start



Revision ID:

Item Name: Crosstube Installation, High Fwd

Stop



Start Date: 7/23/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 8/16/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: 14

Date: 10-7-23

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr
D350-748-141	Rev E

100 0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile & type labels per PPPD350-748-101

CHG001

8/10/08/23

110 0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 1

Memo

0.00

CNC Delta 100 Bender

Bend tube as per Dwg D350-748-141 using CNC bender program D350F and Folio FT

DP

10-8-18

PTD →

120 0.00



QC15- Crosstube Dimensional Check

QC

Memo

0.00

Quality Control

8/10/08/20

Dart Aerospace Ltd

W/O: 60816		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	
10/08/70	#115	Perm. change ADD step to stress relief of steel cross tabs. Per Q57010					S 10/08/70	
10/08/70	#115	Stress Relief steel cross tabs Per Q57010. temp 325° start time 2:00AM Fin time 11AM		10-8-78			S 10/08/70	

Part No: D350-748-101 PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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NOTE: Date & initial all entries



- 4.2.3.12 Slide mandrel on top of both V-blocks and through bracket.
- 4.2.3.13 Tighten both nuts in an equal manner so that there is no play/movement in the mandrel.
- 4.2.3.14 Place buggy in proper orientation per bender folio.

REFERENCE ONLY

4.3 CROSSTUBE STRESS RELIEF (STEEL)

- 4.3.1 Stress relief shall be performed as soon as possible after bending:
 - 4.3.1.1 Place Crosstubes in the oven vertically (as installed on the aircraft)
 - 4.3.1.2 Heat crosstubes at 375 deg F for 4 hours
 - 4.3.1.3 Allow to cool at room temperature

4.4 DT8577A TABLE SETUP FOR ASSEMBLY

- 4.4.1 Remove all bolts (2 per support) in both support stands.
- 4.4.2 Remove both support stands from previous location and place in proper hole location using the hole location chart for DT8577A.
- 4.4.3 Ensure cuff supports provide stability for crosstube during assembly in proper hole location.
- 4.4.4 Tighten all bolts (2 per support).
- 4.4.5 Make sure that painted supports are used for Support/Abrasion Strip installation.
- 4.4.6 Use proper support locating jigs for correct crosstubes. Check with blueprints for correct angles needed.
- 4.4.7 Use correct Abrasion strip locating tools for correct crosstubes.

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Page 2

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QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130 	Crosstubes	0.00							
Crosstubes	Memo 1-Drill Tube as per Dwg D350-748-141 Using DT8876 A,B & C Drill Jigs, Set-up drill table as per QSI 010	0.00							
Crosstubes	2-Deburr								
	3-Engrave Part # and Batch # as per Dwg D350-748-141								
	4-Remove all marks from tube within limits of D350-748-141								
	5- Apply a light coat of LPS3 on the interior of tube Batch: <u>M109956</u>								
140 	QC5- Inspect part completeness to step on W/O	0.00							
QC	Memo CHECK 10 DEG HOLES WITH DT8876E (EUROCOPTER CLAMP)	0.00							
Quality Control									

DP 10-8-23
DP 10-8-24
Solo 10-8-24
②

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Page 3

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QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150  Outsource3	Outsource process-Cadplate per QSI017 4.1.9.1	0.00							
	Memo	0.00							
	Issue P/O: <u>12449</u>								
	Stress relief at 375° for 5 hours								
	Magnetic Particle Inspect per ASTM E1444								
	Cadium Plate per AMS-QQ-P-416B, Class 1, Type 2								
	Embrittle relief at 375° for 8 hours, Chromate Treat								
	Possibe Supplier: Southwest United Industries								
	Ensure Certificate of Conformity is attached								
160  Packaging	Receive & Inspect for Damage & Mat'l Certs	0.00							
	Memo	0.00							
	Ensure certificate of conformity is attached								
170  QC	QC5- Inspect part completeness to step on W/O	0.00							
	Memo	0.00							
	Quality Control								

- C2 10/8/25 ①

10/9/10 ①

10 09 20 ①

270

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
10/9/14	175	NDT per QSI 038 before & after Load testing per eng. This time only P/O: <u>12557</u>	CX	10/9/14	①	W 10/9/14	5 6/6/12
		rec'd + inspect	C	10/9/14	①		

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Page 4

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Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180		0.00							
	SprayPaint					<i>ml</i>	10	09	20 (1)
SprayPaint	Memo	0.00							
Spray Painting	1-Prime inside crosstube as per QSI 005 4.2 2-Prime Outside of Tube as per Dart QSI 005 4.2								
190		0.00							
	QC14- Inspect Spray Paint					<i>ST</i>		10-09-21	
QC	Memo	0.00							
Quality Control	Then, Wrap in plastic bag to protect from scratches								
200		0.00							
	Crosstubes					<i>ml</i>	10	09	21 (1)
Crosstubes	Memo	0.00							
Crosstubes	1-Install Ground wire Insert, then insert screw and washer 2-Install Abrasion strips as per Dwg D350-748-141 & QSI 035. 3-Install supports Using Dt8876 as per Dwg D350-748-141, Torque to 60-80 IN-LBS								

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Friday, July 23, 2010 10:24:58 AM



Page 5

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Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

210



QC

Quality Control

QC5- Inspect part completeness to step on W/O

0.00

Memo

0.00

8/10/22

220



Packaging

Packaging

Pick Kit

0.00

Memo

0.00

8/10/23 (1)

230



QC

Quality Control

QC4- 100% Inspect kits for completeness

0.00

Memo

0.00

8/10/23

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Friday, July 23, 2010 10:24:58 AM



Page 6

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Customer:

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240		0.00							
	Packaging								
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPP D350-748-101								
	Location: <u>10/5</u>								
	PPP Rev: <u>3</u>								
250	QC21- Final Inspection - Work Order Release	0.00							
QC	Memo	0.00							
Quality Control									

10/5/2310/09/27MR
10-7-24

W/O:		WORK ORDER CHANGES					
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Picklist Print

Friday, July 23, 2010 10:25:01 AM

Page 1

Work Order ID: 60816

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 7/23/2010

Required Date: 8/16/2010

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A New Issue 06-07-05 JLM
 IPP Rev:B Update qty of MS21042L5 06-09-12 KJ
 IPP Rev:C Rev B 07-11-15 DD
 IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD
 IPP Rev:E 08-06-24 revD as per dwg DD verified by:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	-------------	--------------	---------------	----------------	--------

D350-748-141TRN Manufactured No



Crosstube Turning Detail

Location

Loc Qty

Loc Code

LG

1

55295

1

ALS4-1032-225 Purchased No



Insert

Location

Loc Qty

Loc Code

PK011

6043

6043

AN960JD10 NAS1149D0363J Purchased No



Washer

D2856-400



Abraison Strip

B# 105792

Manufactured No

Location

Loc Qty

Loc Code

ST403

361.0188421

56626

145.018842

59920

216

B-59326 MB 10-08-18

ml 10-09-21

ml 10-09-21

ml 10-09-21

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Friday, July 23, 2010 10:25:02 AM

Page 2

Work Order ID: 60816

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 7/23/2010

Required Date: 8/16/2010

Start Qty: 1.00

Required Qty: 1.00

D3502-1
Support
Manufactured No

200 Each

56.0000

2 2



m/ 10.09.21

Location

Loc Qty

Loc Code

ST066

56

47120

1

50287

38

52903

17

MS21920-20
Clamp (per MIL-DTL-8783C)
Purchased No

200 Each

103.0000

2 2



m/ 10.09.21

Location

Loc Qty

Loc Code

LG

103

112624

18

114687

35

114779

24

115057

26

MS27039-1-10
Screw
Purchased No

200 Each

133.0000

1 1



m/ 10.09.21

Location

Loc Qty

Loc Code

ST291

133

112794

33

112940

100

Friday, July 23, 2010 10:25:02 AM

Shop Packet Print

Page 2

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Friday, July 23, 2010 10:25:02 AM

Page 3

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Start Date: 7/23/2010

Required Date: 8/16/2010

Start Qty: 1.00

Required Qty: 1.00

AN4-41A

Purchased

No

220

Each

290.0000

8

8



Bolt

Location

Loc Qty

Loc Code

ST360

290

111424

4

113359

86

114941

100

115108

100

M114941

AN4-6A

Purchased

No

220

Each

1,243.000

16

16



Bolt

Location

Loc Qty

Loc Code

ST356

1243

112933

96

113149

344

114523

2

114615

1

114941

500

115108

300

M114941

AN5-32A

Purchased

No

220

Each

228.0000

4

4



Bolt

Location

Loc Qty

Loc Code

ST340

228

113121

4

114056

74

114405

50

115016

50

115108

50

M114056

Friday, July 23, 2010 10:25:02 AM

Shop Packet Print

Page 3

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Required Date: 8/16/2010

Start Qty: 1.00

Required Qty: 1.00

AN960JD416 NAS1149D0463J Purchased No

220

Each

0.0000

32

32



Washer



m115622

AN960JD516 NAS1149D0563J Purchased No

220

Each

0.0000

8

8



Washer



m114742

D3500-1 Manufactured No

220

Each

42.0000

4

4



Saddle



60489

Location

Loc Qty

Loc Code

ST424

26

59120

8

59422

18

ST425

16

55605

16

D3501-1 Manufactured No

220

Each

406.0000

16

16



Bushing



60489/23(1)

Location

Loc Qty

Loc Code

ST066

406

45402

15

45918

112

48268

179

53779

100

53779

Friday, July 23, 2010 10:25:02 AM

Shop Packet Print

Page 4

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Page 5

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Start Date: 7/23/2010

Required Date: 8/16/2010

Start Qty: 1.00

Required Qty: 1.00

MS21042L4

 Nut

Purchased

No

220

Each

3,897.000

24

24



[Signature]

Location

Loc Qty

Loc Code

ST300

3897

113422

68

114523

28

114718

23


114784

1778

115108

2000

M 11/5/08

MS21042L5

 Nut

Purchased

No

220

Each

796.0000

4

4



10/5/23

Location

Loc Qty

Loc Code

ST139

296

114813

296

ST300

500

115156

500

M 11/5/08

W/O:		WORK ORDER CHANGES					
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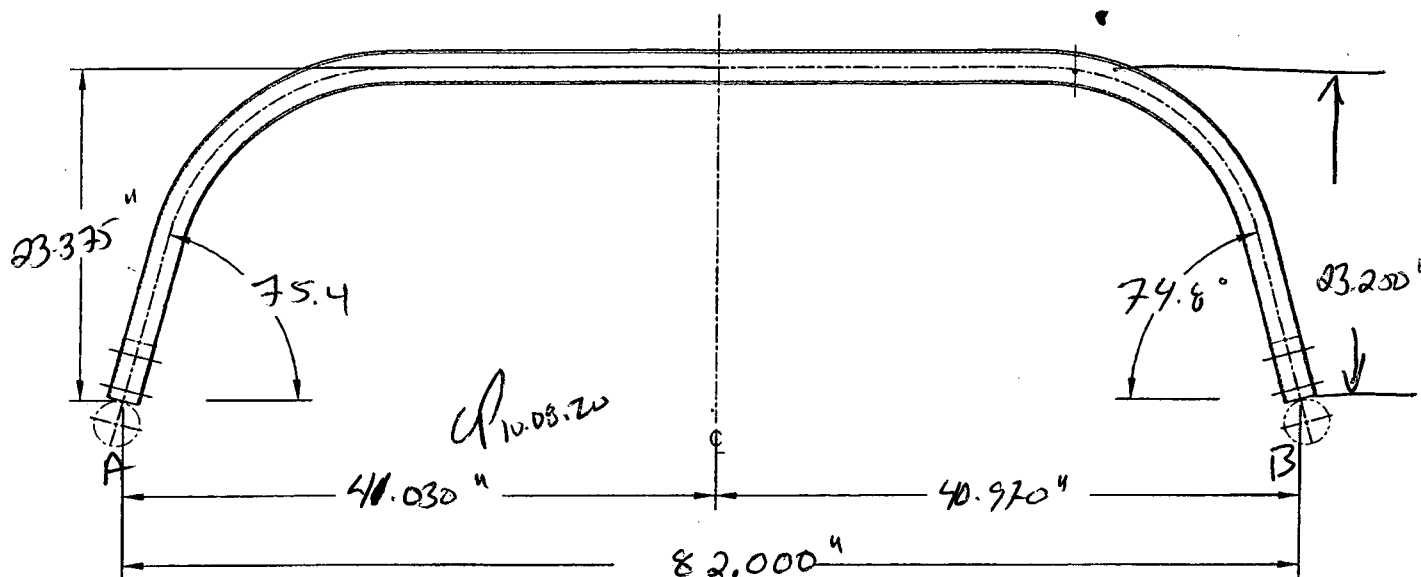
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DART AEROSPACE LTD		Work Order:	60816
Description: Crosstube High Fwd (AS350/355)		Part Number:	D350-748-101
Inspection Dwg: D350-748-141	Rev: D E	Page 1 of 1	

CE 10.08.18

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



Comments
twist = 0.028"
OK P 10.08.20

QC15 Inspection	8
Date	10/08/20

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	[Signature]

Dart Aerospace Ltd

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Item	Qty -141	Part Number	Description
1	X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
2	1	D6017-115	CROSSTUBE
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6017-115
FINISHED LENGTH = 110.270±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D350-748-141" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
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SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. *60816*
BS10-723

RELEASED
2009-10-29
MB

E	REVISE GENERAL NOTES: UPDATE TO CURRENT ADD STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); TOLERANCES (ZN C8-3, D1-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6017-115 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN	<i>RF</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED	<i>RF</i>	DRAWING NO.	REV. E
MFG. APPR.	<i>RF</i>	D350-748-141	SHEET 1 OF 4
APPROVED	<i>RF</i>	TITLE	SCALE
DE APPR.	<i>RF</i>	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COMPILED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

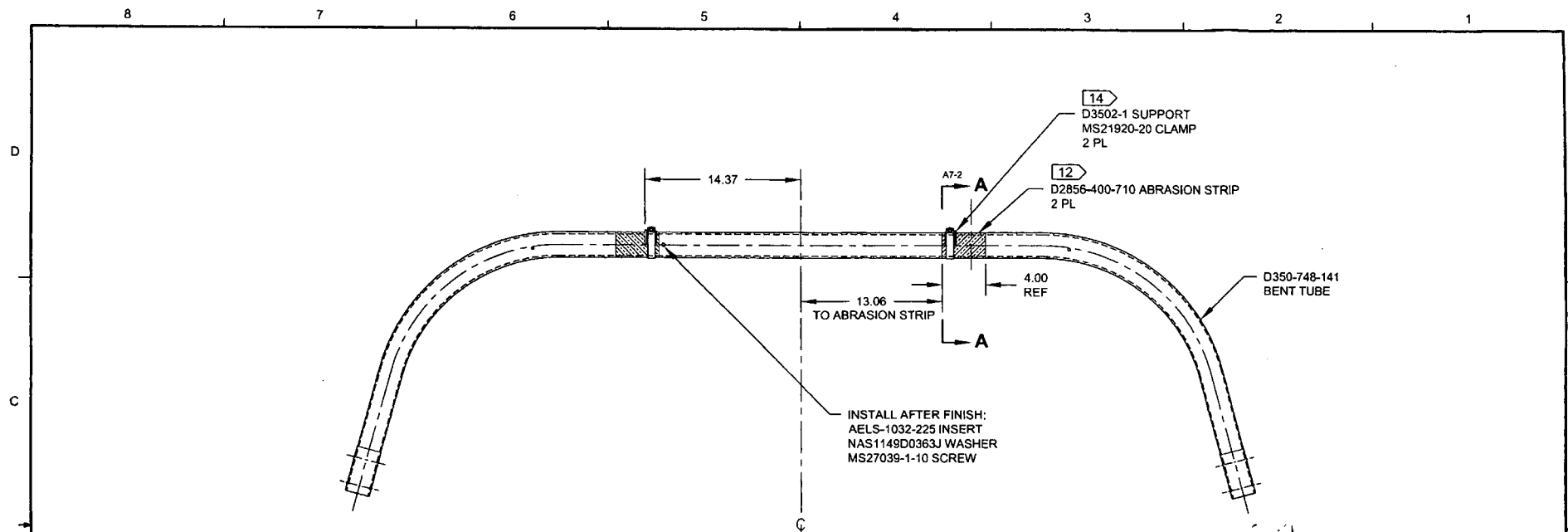
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

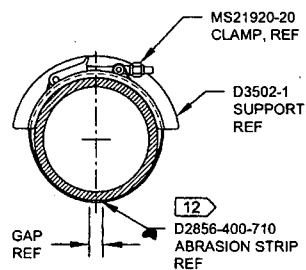
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



**D350-748-141
ASSEMBLY DETAIL**

w/o 60816



SECTION A-A D4-2
SCALE 4X

RELEASED
2009-10-29

DESIGN	RF	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. E
MFG. APPR.	RF	D350-748-141	SHEET 2 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	09.09.30	<small>COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR REPRODUCED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

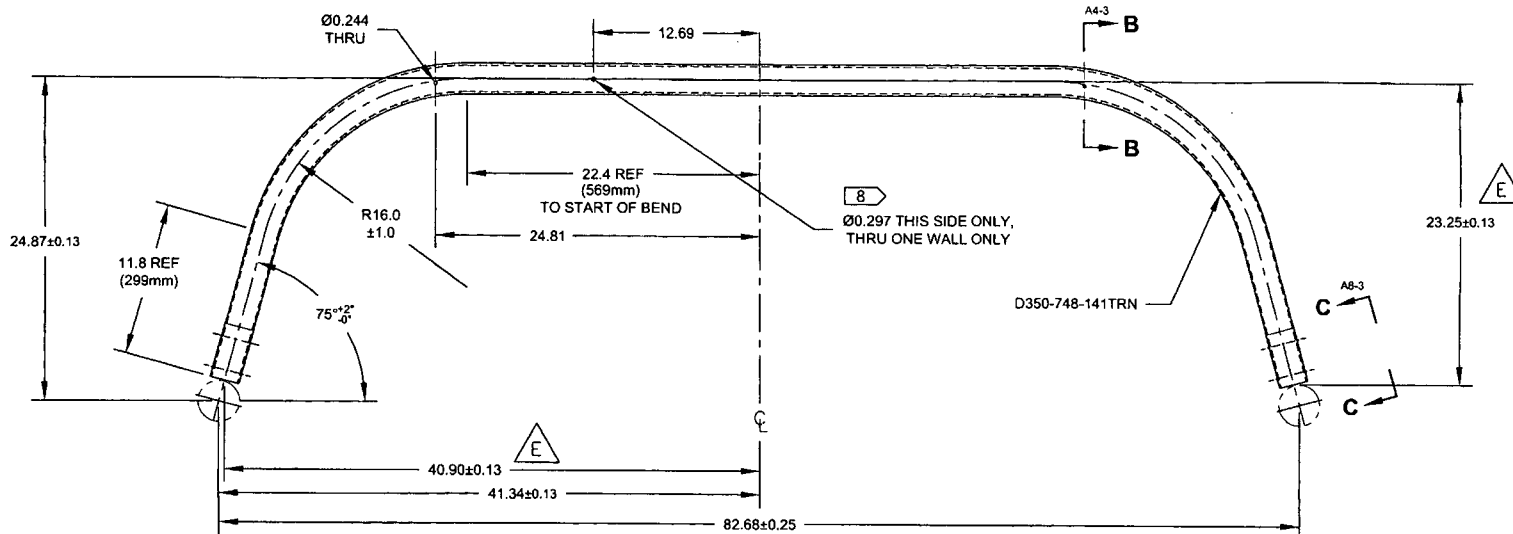
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

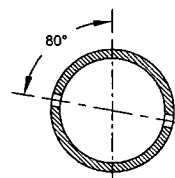
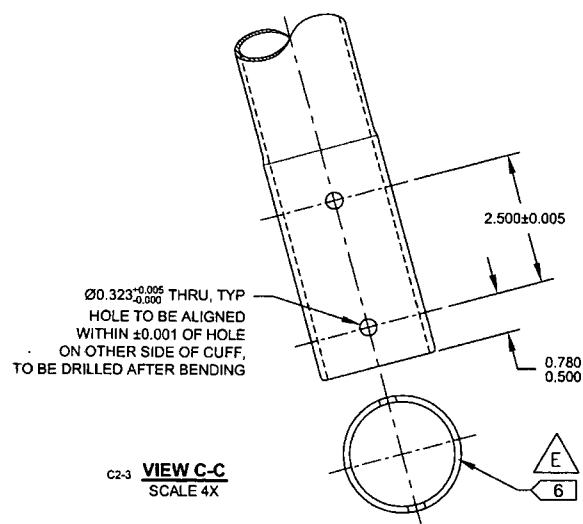
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



D350-748-141
BENDING AND DRILLING DETAIL 10



SECTION B-B D3-3
SCALE 4X

u/o 60816

RELEASED
2009-10-29

DESIGN	RF	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. E
MFG. APPR.	RF	D350-748-141	SHEET 3 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE (AS 350/355 HI FWD)	NTS
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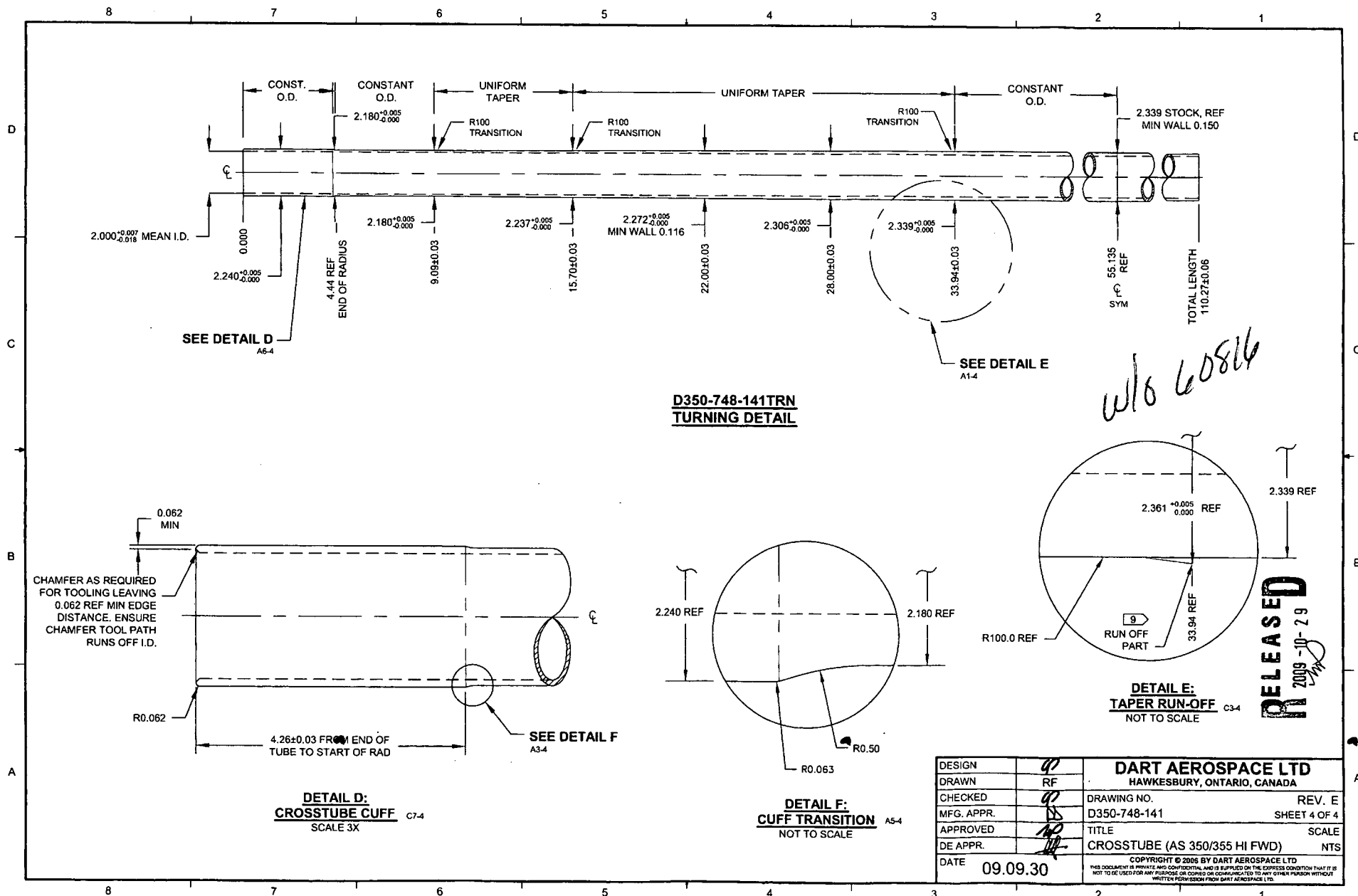
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Vérification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

**CERTIFICATE OF
CONFORMANCE**

**CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1**

DATE: Sep-03-2010

CONSIGNED TO: Dart Aerospace Ltd.
1270 Aberdeen St
Hawksbury, ON K6A 1K7

W/O #: 97979

INVOICE #: 51089

**CONTRACT OR
PURCHASE ORDER #** PO12444

DESCRIPTION: SKID

QTY 1

P/N # d350-748-101

S/N # B60816

**STRESS RELIEF BAKE @ 375 DEG. BAKE HEAT CHART #10-907.
MPI INSPECTED IAW ASTM-E-1444. CADMIUM PLATED IAW AMS-
QQ-P-416C, TYP2 YELLOW, CLASS 1. BAKE HEAT CHART #10-923.**

**CERTIFICATE: I certify that the items indicated here on have
been inspected and tested and conform to all specifications
and requirements detailed on the contract or purchase order.**

Approved Inspector:





LIQUID PENETRANT TEST REPORT

P- 15189

CLIENT	DART Aerospace	DATE	Sept 13-2010	PAGE	1	OF	1
ATTENTION	LINDA/CHANTAL	ACUREN JOB No.	100-10-0838	TIME	AM	<input checked="" type="checkbox"/>	PM <input type="checkbox"/>
ADDRESS	1270 ADELPHI STREET. HAWKESBURY ON KOH 1KT	PO/NO No.	12444	WORK LOCATION	HAWKESBURY PLANT		
PROJECT	F.P.I. on CROSS TUBES	ACCEPTANCE STD.	ASTM 1417	REV./DATE	2007		
ITEM(S) EXAMINED	11						

JOB DESCRIPTION	PROCEDURE No. LT-0002	REV./DATE	—	TECHNIQUE No. LT-0002	REV./DATE	—
PART No.	—					
SCOPE	WET FLOWESCENT LIQUID PENETRANT INSPECTION CARRIED OUT 100% EXTERNAL.					

TEST DETAILS							
METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED		
FAMILY BRAND	MAGNAFLUX		BLACK LIGHT S/N	16459	<input type="checkbox"/> OUTPUT > 1000 μ W/cm ²	<input type="checkbox"/> AMBIENT < 2 fc	
PENETRANT	2LG7	MINIMUM DWELL TIME	45 MIN.	LIGHTING EQUIP.	<input type="checkbox"/> FLASHLIGHT	<input type="checkbox"/> TROUBLELIGHT	<input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER	H2O	MINIMUM DRY TIME	> 10 MIN.	OTHER	LAB. NO.		
DEVELOPER	SKD 52	MINIMUM DWELL TIME	10 MIN.	LIGHT METER S/N	1098866	CAL DUE DATE	06-7-10
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY				2010

TEST SURFACE					
SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input checked="" type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < -4°C/ 20°F	<input type="checkbox"/> -4°C/ 20°F TO 10°C/50°F	<input checked="" type="checkbox"/> 10°C/50°F TO 52°C/125°F	<input type="checkbox"/> > 52°C/125°F	

RESULTS- (☐ METRIC ☐ IMPERIAL)

1 - CROSS TUBE W.O. 59905 ✓	- EXAMINATION WAS COMPLETED PRIOR TO DEFLECTION TESTING 10-09-20
1 - CROSS TUBE W.O. 60815 ✓	
1 - CROSS TUBE W.O. 59907 ✓	
1 - CROSS TUBE W.O. 60816 ✓	
1 - CROSS TUBE W.O. 59905 ✓	
1 - CROSS TUBE W.O. 60820 ✓	
1 - CROSS TUBE W.O. 60821 ✓	
1 - CROSS TUBE W.O. 60822 ✓	
1 - CROSS TUBE W.O. 60817 ✓	
1 - CROSS TUBE W.O. 60918 ✓	
1 - CROSS TUBE W.O. 59904 ✓	
1 - CROSS TUBE W.O. 59906 ✓	

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES		DTR #	E63387
CLIENT REPRESENTATIVE	Zan Tittley	REPORT REVIEWED BY:	
TECHNICIAN (SIGNATURE):	Mike Jettus	NAME	INITIALS
NAME (PRINT):	Mike Jettus		
CGSB LEVEL	1 ST SNT LEVEL	CGSB LEVEL	2 ND SNT LEVEL
CGSB REG. NO.	6606	CGSB REG. NO.	



LIQUID PENETRANT TEST REPORT

P- 15191

CLIENT	<u>DART Aerospace</u>	DATE	<u>SEP 13-2010</u>	PAGE	<u>1</u> OF <u>1</u>
ATTENTION	<u>LINDA/CHANTEL</u>	ACUREN JOB NO.	<u>188-10-0838</u>	TIME	AM <input checked="" type="checkbox"/> PM <input type="checkbox"/>
ADDRESS	<u>1270 ABELDEEN STREET</u>	PO/VO No.	<u>12444</u>		
	<u>HAWKESBURY, ON.</u>	WORK LOCATION	<u>HAWKESBURY PLANT.</u>		
PROJECT	<u>KOH IK7</u>	ACCEPTANCE STD.	<u>ASTM 1417</u>	REV./DATE	<u>2007</u>
ITEM(S) EXAMINED	<u>F.P.I.</u>	<u>ON</u>	<u>CROSS TUBES</u>		
		<u>19</u>			

JOB DESCRIPTION	PROCEDURE NO. <u>LT-0002</u>	REV./DATE	<u>-</u>	TECHNIQUE NO. <u>LT-1417</u>	REV./DATE	<u>-</u>
PART NO.	<u>-</u>	MATERIAL	<u>STEEL</u>	THICKNESS	<u>-</u>	
SCOPE	<u>WET FLOUORESCENT LIQUID PENETRANT</u> <u>INSPECTION CARRIED OUT 100% EXTERNAL</u>					

TEST DETAILS	
METHOD	<input checked="" type="checkbox"/> FLUORESCENT <input type="checkbox"/> VISIBLE
FAMILY BRAND	<u>MAGNAFLUX</u>
PENETRANT	<u>2L07</u> MINIMUM DWELL TIME <u>45</u> MIN.
PENETRANT REMOVER	<u>H2O</u> MINIMUM DRY TIME <u>>10</u> MIN.
DEVELOPER	<u>SKD/52</u> MINIMUM DWELL TIME <u>10</u> MIN.
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS <input type="checkbox"/> AQUEOUS <input type="checkbox"/> DRY
	<input checked="" type="checkbox"/> WATER WASH <input type="checkbox"/> SOLVENT REMOVABLE <input type="checkbox"/> POST EMULSIFIED
	BLACK LIGHT S/N <u>16459</u> <input type="checkbox"/> OUTPUT > 1000 μ W/cm ² <input type="checkbox"/> AMBIENT < 2 fc
	LIGHTING EQUIP. <input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT <input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
	OTHER <u>LAB. NO</u>
	LIGHT METER S/N <u>1098866</u> CAL DUE DATE <u>OCT 19 2010</u>

TEST SURFACE	
SURFACE CONDITION	<input type="checkbox"/> AS GROUND <input type="checkbox"/> AS WELDED <input checked="" type="checkbox"/> MACHINED <input type="checkbox"/> SHOT BLASTED <input checked="" type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < -4°C/ 20°F <input type="checkbox"/> -4°C/ 20°F TO 10°C/50°F <input type="checkbox"/> 10°C/50°F TO 52°C/125°F <input type="checkbox"/> > 52°C/125°F

RESULTS- <input type="checkbox"/> METRIC <input type="checkbox"/> IMPERIAL	<div>1 - CROSS TUBE W.O. 59905 ✓ 1 - CROSS TUBE W.O. 60815 ✓ 1 - CROSS TUBE W.O. 59907 ✓ 1 - CROSS TUBE W.O. 60816 ✓ 1 - CROSS TUBE W.O. 60820 ✓ 1 - CROSS TUBE W.O. 60821 ✓ 1 - CROSS TUBE W.O. 60822 ✓ 1 - CROSS TUBE W.O. 60817 ✓ 1 - CROSS TUBE W.O. 60818 ✓ 1 - CROSS TUBE W.O. 59904 ✓ 1 - CROSS TUBE W.O. 59906 ✓</div> <div>- EXAMINATION WAS COMPLETED * AFTER DEFLECTION TESTING M 10 09 20</div>
--	---

Scope of Services
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SIGNATURES		DTR # <u>E63387</u>
CLIENT REPRESENTATIVE	<u>[Signature]</u>	REPORT REVIEWED BY:
TECHNICIAN (SIGNATURE):	<u>[Signature]</u>	NAME INITIALS
NAME (PRINT):	<u>Mike Johnston</u>	
CGSB LEVEL <u>II</u> SNT LEVEL <u>6606</u>	CGSB LEVEL <u>II</u> SNT LEVEL <u>6606</u>	
CGSB REG. No. <u>6606</u>	CGSB REG. No. <u>6606</u>	

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